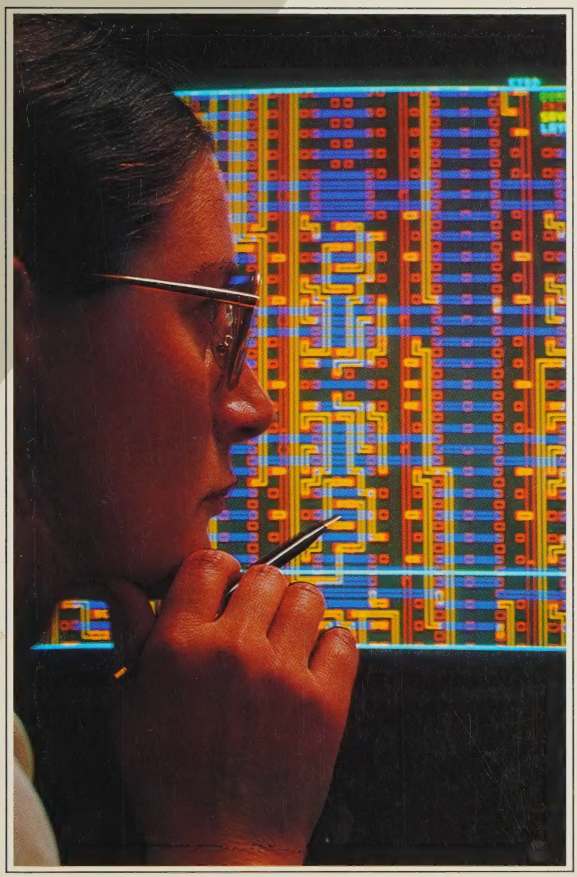
1984 ANNUAL REPORT



ONTARIO
CENTRE
FOR
MICROELECTRONICS

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Cover photo:
Ontario Centre for Microelectronics engineer Anne Blais inspects a microchip layout completed on one of the Centre's computer aided design terminals.

Board of Directors

Chairman

Gordon W. Gow, Chief Operating Officer, NABU NETWORK Corporation, Ottawa

Directors*

T.S. (Dudley) Allan, President, Control Data, Mississauga

Archie Bowen, Professor, Systems and Computer Engineering, Carleton University, Ottawa

Michael Caughey, Interim President, Ottawa-Carleton Research Institute, Ottawa

Sidney Handleman, Consultant, Public Affairs International Ltd., Nepean

Rich McDonald, Bell Northern Research, Ottawa

David Moore, President, Siltronics Ltd., Ottawa

Elizabeth Parr-Johnston, Manager, Macroenvironment, Shell Canada Ltd., Toronto

Colin Patterson, Vice-President Technology, Gandalf Technologies Inc., Nepean

Glenn Pattinson, Vice-President, Communications, Electronic, Electrical, Technical and Salaried Workers of Canada, Toronto

Walter Pieczonka, President, Linear Technology Inc., Burlington

Andrew Szonyi, Professor, Engineering and Management, University of Toronto, Toronto

Peter Vice, Lawyer, Vice and Hunter, Ottawa

Charles Williams, President, Geac Computers International Inc., Markham

Robert Mitchell, MPP-Carleton, and Robert MacQuarrie, MPP-Carleton East, are both ex-officio members of the board.

*Ted Rogers, Chief Executive Officer, Rogers Cablesystems Inc., Toronto, retired from the Board October 1983

Committees of the Board

Audit & Finance

Chair: Gordon W. Gow

Members: Glenn Pattinson
Charles Williams
David Moore
Peter Vice

CAD Technology

Chair: Michael Caughey

Members: Walter Pieczonka
Archie Bowen
Colin Patterson
David Moore

Public Affairs

Chair: Sidney Handleman

Members: Andrew Szonyi
Glenn Pattinson
Rich McDonald
Charles Williams

Benefits, Compensation and Personnel

Chair: Peter Vice

Members: Andrew Szonyi
Glenn Pattinson
Rich McDonald

Strategic Planning

Chair: Elizabeth Parr-Johnston

Members: Walter Pieczonka
Archie Bowen
Micheal Caughey
Sidney Handleman
Andrew Szonyi
Dudley Allan

Senior Management

Lionel Hurtubise, President
Glen Morrow, Vice President Finance and Administration Secretary, Treasurer
Karl Mayer, Vice President Technology
Robert Copeland, Director Business Development
Ian Mumford, Director Corporate Affairs

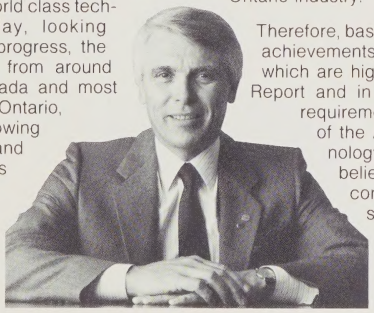
LETTER FROM THE CHAIRMAN

The Honourable Frank Miller
Minister of Industry and Trade

Dear Sir:

It is with great pleasure I submit this second annual report of the Ontario Centre for Microelectronics for the 1983/84 fiscal year.

Last year I reported we had laid the foundation and created the programs that would make OCM a "world class technology centre". Today, looking back over the year's progress, the interest in the Centre from around the world, across Canada and most importantly all parts of Ontario, and the Centre's growing capabilities in staff and equipment, we find signs everywhere that we are accomplishing this objective.



The committees of your Board of Directors have been very active. I would like to report briefly on their progress:

The Finance & Audit Committee has met regularly to plan and monitor the operating policies and financial results of the Centre.

The CAD Technology Committee has worked closely with management to guide the selection and use of the Centre's design aid systems. Its advice and experience has proven invaluable.

The Public Affairs Committee has been working to improve and evaluate the Centre's Corporate Affairs strategy and outreach activities.

The Benefits, Compensation and Personnel Committee has played a key role in advising the Centre on how to attract and retain the qualified people necessary for its success.

The Strategic Planning Committee has worked throughout the year to streamline and refine the Centre's strategy for achieving our mandate of assisting industry to increase the production of manufactured goods in Ontario. It has reviewed the Centre's Original Business Plan of June 1982 and advised management in the preparation of a new Strategic Plan for the period April 1984 to March 1989. This important document reflects the current needs of industry and the latest trends in microelectronics technology. The development of this Strategic Plan reflects the Board's belief that the Centre is providing a valuable service to Ontario industry.

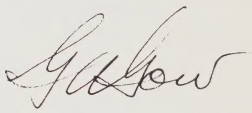
Therefore, based on the progress and achievements during the past year which are highlighted in this Annual Report and in accordance with the requirements of Section 13 (3) of the Act to establish Technology Centres, the Board believes the Centre should continue to carry out its stated objectives.

The year under review has also been marked by unprecedented interest in technology. In sharing its expertise throughout 1983/84, the Centre has been in constant communication with other technology transfer initiatives across Canada. These consultations have included the Ontario Research Foundation, the Canadian Microelectronics Corporation, the Canadian Semiconductor Design Cooperative, microelectronics centres in other provinces, and the other Ontario Technology Centres. As an active participant in this network of initiatives, the Board will continue to monitor issues essential to the future of the Canadian microelectronics industry.

One issue of concern is the need for an independent Canadian silicon foundry. At present, foundries in the United States and the Pacific Rim are predominately used for the manufacture of Canadian designed circuits. A domestic facility would give Canadian designers the all important direct access to the engineers who actually produce the circuit in silicon. The Board believes that this direct access coupled with the potential for improved service and delivery schedules of final microchips would add an important plus for Ontario industry in

the drive to further international market opportunities. As a result, the Centre has brought together a group of Canadian experts to look at the potential for creating such a facility.

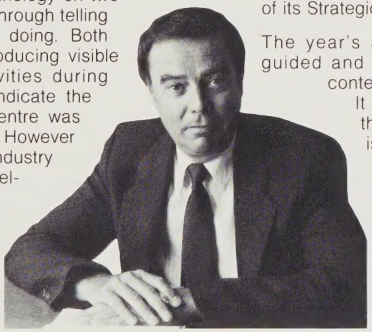
The Ontario Centre for Microelectronics has come a long way since last year's Annual Report. It has been a year of significant milestones and it is rewarding to see the results of the Centre's work in fulfilling its mandate. Yet, the potential remains enormous and I know the members of your Board look forward to another exciting and productive year.



Gordon W. Gow
Chairman of the Board

LETTER FROM THE PRESIDENT

In 1982 the Ontario Centre for Microelectronics was established to assist Ontario industry to prosper through the application of microelectronics. In fact, economic benefits such as increased domestic wealth, higher employment and improved international competitiveness are the major reasons for the Centre's existence. To reach our objectives the Centre has implemented a strategy to diffuse technology on two broad fronts: diffusion through telling and diffusion through doing. Both thrusts are already producing visible results. Indeed, activities during 1983/84 fiscal year indicate the requirement for the Centre was greater than anticipated. However to match changing industry needs with recent developments in the technology, we required more specific information on our market, Ontario industry. To fill this need we undertook during the year a major study of microelectronics awareness in Ontario industry.



The results allowed us to formally establish the level of awareness and current penetration of microelectronics in Ontario industry and fine tune our programs accordingly. Some highlights of the study are:

- Generally the perception of the importance of microelectronics is good.
- Awareness about the technology and its benefits is limited outside of the electronics sector.
- Lack of technical manpower and capital funding are major constraints to using microelectronics.
- Low emphasis on research and development severely hinders the widespread application of new technology.
- The overwhelming majority of Ontario companies using microelectronics report increased sales and lower costs.

Clearly these findings not only support the need for the services provided by the Ontario Centre for Microelectronics, but more importantly, they have allowed us to focus our resources and efforts in the areas that best benefit Ontario industry.

The Board of Directors and the Centre's management team have used the study to refine its activities and programs to ensure the optimum allocation of technical facilities and human resources. The accompanying flow chart provides an overview of the Centre's activities within the framework of its Strategic Plan.

The year's activities have been guided and evaluated within the context of the Strategic Plan. It is for this reason that the balance of the report is presented by type of activity as laid out in the Strategic Plan Overview.

It has been an encouraging year. The Centre's first report stated that the prime measure of the Centre's success would be the number of people impacted by its activity. In the last twelve months the Centre's staff and board members have made direct contact with more than 40,000 people in Ontario through training seminars, speeches, newsletters, tours and presentations.

More than 360 technical contacts have resulted in the preparation of 65 detailed proposals and 39 letters of recommendation. This concentrated marketing activity resulted in 17 technical contracts.

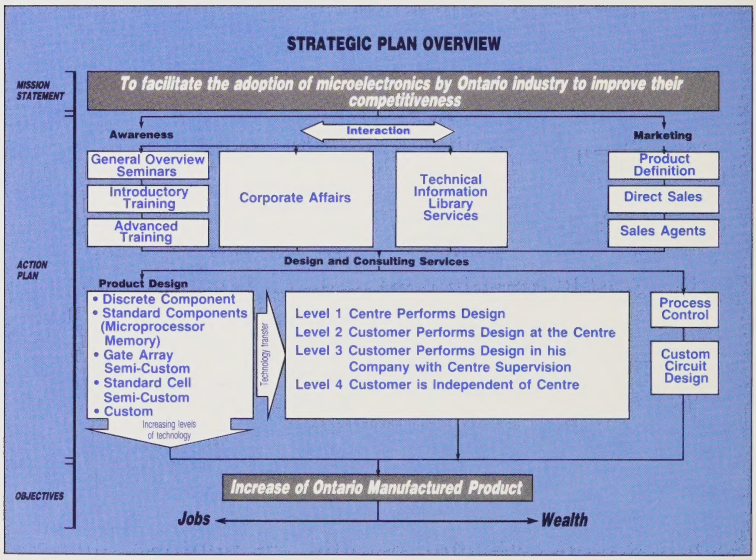
These successes were slightly tempered by a longer than expected time between the presentation of proposals and the signing of contracts. As a result revenues were slightly lower than forecast. However, we have discovered that although some proposals have yet to result in a contract, the information contained in those proposals often provides companies with invaluable knowledge that helps them plan for a more competitive future.

The Study of Microelectronics Awareness in Ontario Industry and the Centre's Strategic Plan set the stage for capitalizing on the

increasing interest in the Centre, and the technology. When combined with the Centre's well-defined, in-place administrative policies and functions, and technical base we feel confident we will continue to achieve our mandate with maximum efficiency.

I would like to take this opportunity to express appreciation to our Board of Directors and staff for their efforts to help Ontario industry become better world-class competitors through the application of microelectronics technology.

Lionel Hurtubise
President



DIFFUSION THROUGH TELLING

"After dealing with Centre engineers we better understand the significant benefits available through the implementation of state of the art microelectronics."

Al Fallis
General Services Manager
Gates Canada Inc.,
Brantford

The first step in increasing use of microelectronics is awareness of the technology and what it can do. The Centre has three streams of activity designed to fill different information needs: Corporate Affairs; Training; and Technical Information Services.

CORPORATE AFFAIRS

The Corporate Affairs Department manages an overall communications program designed to promote microelectronics in general and to stimulate interest in the Centre's services. Corporate Affairs activities are frequently the first contact with the Centre for prospective clients.

Microbits

Corporate Affairs produces Microbits, the Centre's newsletter, which provides ongoing information on the Centre's activities, developments in the technology and role models on the application of technology in Ontario industry. At present Microbits reaches more than 20,000 people every 2 months.

Trade Shows

Exhibiting at appropriate trade shows has provided an opportunity for the Centre's staff to meet many prospective clients who may not have been reached in any other way. This year OCM exhibited at several trade shows including: the International Electrical and Electronic Engineers (IEEE) Conference and Exhibition, SITEV '83 (an international exhibition for the suppliers of the vehicle industry) and the Canadian Computer Show.

Speeches and Presentations

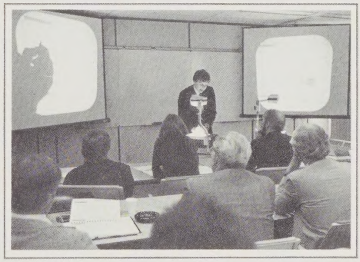
Centre staff and members of the Board have taken advantage of many opportunities to present the Centre's story to business and technical groups across Ontario. The numerous opportunities have included the Canadian Institute of Food Science and Technology, Society of Reliability Engineers, Military Engineers of Canada, Canadian Association for Information Sciences, Armed Forces Communication Electronics Association, Canadian Information Processing Society, Ontario Electrical League, Periodical Writers Association of Canada, several chapters of the Association of Professional Engineers of Ontario, and many service clubs and community groups.

Overview of Microelectronics Seminars

Designed for the non-technical, the Overview of Microelectronics seminars provide a valuable introduction to microelectronics technology and its potential benefits. More than 570 industry and community leaders have attended these seminars held across Ontario.

Industry Days

The Centre hosted three open houses last year. Designed to give a first hand look at the Centre's facilities and services, the days attracted more than 480 people.



Tours

In addition to Industry Days the Centre's staff have provided guided tours of the facility to people from across Canada and around the world. Some notable visitors to the Centre include; representatives of the Australian government, trade missions from the Peoples Republic of China, Japan, Holland, Belgium, Yugoslavia, officials from other Canadian microelectronics centres, all levels of government, many universities and community colleges, and industrial associations.

Media

The Centre's programs and activities attracted considerable media attention during the year, particularly by business and technical journalists.

"The Overview of Microelectronics Seminar made me realize that microelectronics is accessible at volume levels and at a cost lower than I anticipated."

Rodney Jones
Engineering Manager
Electrohome Motor Division, Cambridge

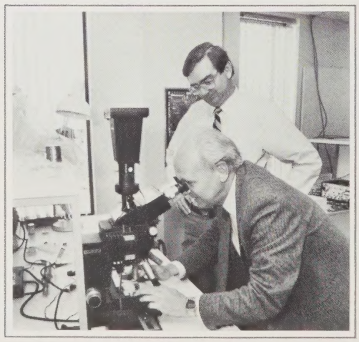
"I found your seminar comprehensive, informative and useful".

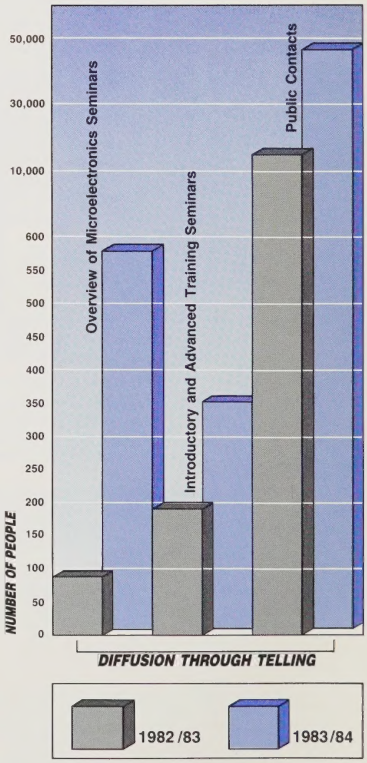
J.W. Gleason
Vice President, Chief Technical Officer
Canadian Fram Ltd., Chatham

TRAINING

In addition to the Overview of Microelectronics seminar, the Centre has developed a number of technical courses. Led by industry specialists these unique courses received growing interest throughout Ontario.

The training programs included both introductory and advanced technical courses. Introductory courses (Introduction to Electronics Manufacturing and Introduction to Microcomputers and Microprocessors) have been designed by the Centre to provide companies with the basic knowledge required to evaluate and plan their entry into microelectronics. Advanced courses (Software Project Management In Microelectronic Design; Microprocessor Hardware, Software and Interfacing; Pascal, ADA, and C In Microelectronic Design; Advanced Microprocessor System Design; Gate Arrays: An Approach to Semi-Custom Integrated Circuit Design; Fundamentals of Semi-Custom Integrated Circuit Design) offer industry engineers the latest information in microelectronic design and system management.





The Centre presented more than 20 courses to more than 350 engineers and technicians during the year throughout Ontario. On several occasions courses were tailored to the specific interest of educational, financial and industrial groups. The Centre has also taken courses directly to the companies such as, Canadian Fram Ltd. in Chatham and Edwards of Canada in Owen Sound.

The increasing level of interest and excellent response from attendees indicate that technical training programs will continue to play a growing role in the Centre's activities.

TECHNICAL INFORMATION SERVICE

The Centre's Technical Information Service brings together information from many subjects on microelectronics technology, applications, and a wide range of related subjects. An up-to-date collection of books, periodicals, standards and patents, complemented by access to an extensive array of databases provides the Centre's staff, as well as industrial clients, with a powerful information resource.

Technical Information Service library professionals have provided relevant information to OCM customers efficiently and economically. Requests for information this year covered a vast realm of topics, from specific technical questions to those dealing with the social implications of microelectronics technology.

"The Centre's Technical Information Library Service has provided us with very valuable material for our industrial development strategy."

Sandra Lawn
Mayor
Town of Prescott

DIFFUSION THROUGH DOING

"OCM has done much more than I expected and has done it well."

Merv Sullivan
President
Reltek Inc., Kanata

The key thrust of the Centre's activities is to perform microelectronic contract services in parallel with the growing level of technical awareness. OCM's active marketing functions are fundamental to the development of the service facet of the Centre.

BUSINESS DEVELOPMENT

The Business Development Department works to bridge the gap between the needs of industry and the Centre's services. Based on the requirements of customers, Business Development staff provide the Centre with factual data and trend analysis capability which enables both the Technical and Technical Training Departments to adjust to the needs of Ontario industry.

Marketing (Business Development) personnel have processed thousands of leads, resulting in approximately 360 technical contacts between the customer's engineering staff and OCM technical services personnel. By year end, 65 detailed technical proposals and 39 letters of recommendation were prepared; and 17 contracts were booked. The majority of the issued proposals remain active as individual customers phase in new product development plans into their existing product portfolio.

The sales organization of OCM not only "sells" the Centre's services, but provides a valuable interface with industry. OCM reaches its markets in a number of ways as listed below.

Direct Sales

OCM staff are constantly working to identify and approach companies which could benefit from the Centre's services.

CANTEC

In January the Centre appointed CANTEC Representatives Inc., an electronics manufacturing representative, as sales agent for OCM technical design services. CANTEC's 19 Ontario sales representatives are in regular contact with the electronics industry. The appointment has significantly improved OCM's service and representation throughout the province.

Government Offices

Ontario Ministry of Industry and Trade field officers as well as consultants from the National Research Council, Ontario Research Foundation, and the federal Department of Regional Industrial Expansion have been kept aware of the Centre's services and have provided a number of referrals throughout the 1983/84 year.

Other Technology Centres

During 1983/84 OCM accepted a number of referrals from other Ontario Technology Centres, and the recently established University of Toronto Microelectronics Development Centre.

Other Marketing Activities

During the last year, marketing at the Centre has evolved beyond the sales and interface role. On several occasions the Centre has provided information on possible sources of funding and has been involved in referring companies to the appropriate people and organizations for marketing and other advice.

"With the assistance of OCM, semicustom integrated circuits are now very much a part of our future product planning".

C.A.A. MacPhee
Vice President R & D
Federal Pioneer, Toronto

OCM also played a key role in the creation of six new Ontario firms during the year by introducing potential investors to companies or groups with sound technical innovations.

As part of the Centre's marketing strategy, several key industry sectors with the most potential to benefit from microelectronics have been identified.

Electronics firms are currently the main target of the marketing efforts. As the Centre's research and field experience have identified, this sector has an understanding of the technology and the products are generally suitable for application of state of the art microelectronics. The electronics sector will remain the primary target in 1984/85.

In subsequent years, OCM will shift its efforts to the industrial sectors addressed by other Ontario technology centres namely, CAD/CAM, robotics, automotive parts, resource machinery, farm machinery and food processing equipment.

Other industry sectors where substantial opportunity exists for the technology will follow after appropriate market research has been conducted.

TECHNICAL ACTIVITIES

The cumulation of OCM's efforts to promote an understanding and use of microelectronics is in its technical design and consulting services. Contract services generated the bulk of the Centre's revenues last year.

The major activity of the Centre's Technical Department is the design of semi-custom integrated circuits, and general electronic circuit design and product development using microprocessors and other standard electronics components. Clients are encouraged to actively participate in the design process and to familiarize themselves with design aids and methods using OCM's extensive computer facilities.

"The Centre provides a valuable service to small companies such as ours. Their engineers are working with us to develop an updated, sophisticated, and cost effective instrument."

Robert Elliott
Vice President
CoSensor International, Markham

Technical staff have provided valuable third-party evaluation of new products from a technical standpoint, to help investors or bankers in the evaluation of company prospects or projects.

The Centre has been very successful in assembling a team of engineers with extensive industrial background, plus a number of recent graduates with high scholastic standing and pertinent academic experience.

Consultation and Design Services

Demand for the technical services of the Centre materialized in two primary areas: the application of customized integrated circuits, or silicon chips, to increase the capability and reduce the cost and size of electronic products; and the design and development of electronic products for mostly non-electronic oriented client companies.

Chip Design

In chip design, it must be realized that an often difficult change in engineering approach and product planning is required to progress from breadboard circuits developed using standard components to integrated circuits developed using computer simulation.

"The Centre was able to point Leigh Instruments in the right direction and provide background on semi-custom integrated circuits through its seminars."

Rod Woolley
Principal Engineer
Leigh Instruments, Ottawa

"OCM provided invaluable assistance in bringing to function a device that when installed into the home and coupled with hard wire smoke detectors will ultimately save countless lives and greatly reduce the dollar loss as a result of avoidable fires."

Frank Mitchell
President
Mitchell Fire Protection, Sudbury

The required rethinking of product development and infrequent or unrecognized "windows" of opportunity have delayed the number of actual designs performed relative to the original expectations. Since there is no lack of recognition that many electronic products will have to use customized silicon chips to be competitive, the work of the Centre in this area may be even more important than initially assumed. Fortunately in contrast to fully commercial undertakings, the Centre is able to devote more effort to inform and educate clients.

The many proposals issued and recommendations given by the Centre have served in a very concrete way to inform clients of existing opportunities and methods used for chip implementation.

The design process itself has been exercised and streamlined during the year. Important foundry relationships with chip producers have also evolved giving clients preferential price and service considerations.

The acquisition of wafer probing equipment gives the Centre the capability to test unpackaged chips and wafers and allows an additional mode of interaction with silicon foundries.

Product Design

The intended mission of the Centre to provide an R & D capability for clients, "An R & D Lab at Your Fingertips", has continued to become more effective during the year. Proposals were prepared and contracts performed for both clients with no electronics development capability and for clients needing additional or specialized services.

"We were already talking to other companies but in the end it just became more convenient to use OCM's services. Together we arrived at a cost competitive solution needed in the short time frame required."

Gunnar Wareberg
Vice President
Optotek, Ottawa

Based on the availability of OCM technical services, a number of product developments have been started which will find their market introduction during the current fiscal year. As the Centre's capabilities become known and tested and the results of feasibility studies are transformed into product plans, the trend toward more sizable development contracts is clearly visible.

Design Aids

The importance of design aids in modern engineering and the absolute dependence of integrated circuit, or chip design, on computer assisted methods is by now widely recognized. It is for this reason that the major portion of capital expenditures and a significant part of engineering effort at the Centre is devoted to the acquisition, implementation and operation of design aids.

At the beginning of this second year of operation, the VAX 11/780 host computer system became operational and the TEGAS software system from Calma Company was installed. It allows the designer to exercise a logic circuit such as a gate array in simulation, hence ensuring that the chip so designated will work as expected.

Simultaneously, a plan for the overall structure of the design aids system containing the major operational software modules, data provided by silicon vendors and data generated from design activities, was developed and followed. Assurances for data protection were implemented through controlled access and backup procedures. A significant part of the effort was devoted to make the use of design aids convenient and 'friendly' and therefore to make learning easier for IC design engineers within the Centre and especially for client engineers wishing to use the design aids of OCM and guidance of its technical staff.

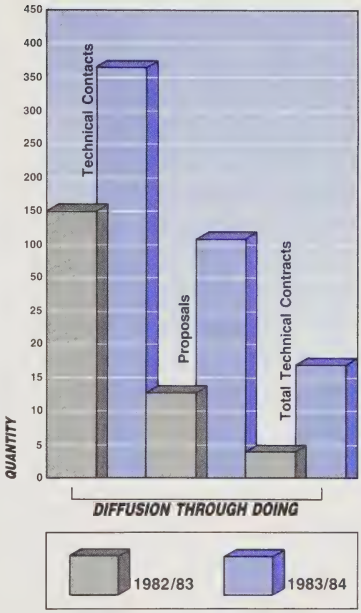
"Although we have a background in technology, we could not afford to lose valuable time experimenting on our own. We decided to tap the experts at the Ontario Centre for Microelectronics".

John Harris
President
Jemtech Ltd., Ottawa

Later in the year, the schematic entry system, TEGATE, also from Calma, was installed. This allows designers to draw circuits on a graphics display terminal, obtain high quality documentation and, even more importantly, automatically generated the computer code for simulation.

An important capability extension came with the acquisition of the major software system MEDS from Scientific Calculations Inc., for gate array and standard cell design, automatic layout, routing, and the creation of chip masks. Using this software OCM was able to perform its first design to the production tooling data stage around the end of the year. Also necessary was the provision and absorption of an extensive physical data base for chips from a silicon foundry. Together, this capability provides the Centre with additional strength in the design process and its clients with lower cost and faster development times.

These measures have brought the Centre into position to efficiently handle the increasing requirements for chip implementation which in turn will create an increasing number of cost effective, competitive Ontario products.



"NABU compliments OCM staff for taking a significant role in the success of our improved product. Without their dedication and leadership it's unlikely we would have successfully completed our gate array on time and within cost restraints. The gate array means very significant direct cost savings, and savings due to reduced space and power requirements. Two circuit boards with a total of 39 integrated circuits were reduced to a single board with nine integrated circuits."

Harry Hollander
Manager Communications Engineering
NABU NETWORK Corporation, Ottawa

CASE STUDY

Ottawa Firm Uses Gate Array to Maintain Unique Product's Competitive Edge

Sometimes the application of gate array technology to a product can mean more than merely adding a competitive edge — it can also mean keeping it. That's the experience of Ottawa's Optotek Ltd., one of the most advanced Light Emitting Diode (LED) manufacturers in North America, where the move to semi-custom IC technology is helping to ensure the application of a successful product.

While LEDs are more familiarly known as those red lights in calculator displays, one of Optotek's diverse semiconductor optics products is a diode matrix that automatically marks time, date and location on military reconnaissance film. When Optotek introduced its LED product to cameras a few years ago, it revolutionized reconnaissance by allowing a computer to sort these miles of film for the first time.

However, the latest generation of cameras posed a problem. They were too small to accommodate the existing marking device. So Optotek turned to gate arrays to reduce the package size.

Working with Centre staff, the result was a reduction of the interface decode-drive function of the LED display to one-quarter of its former size and added reliability. In the long-term, officials at Optotek believe gate arrays will also prove less costly.

Although Optotek has its own design capability at its extensive east Ottawa semiconductor manufacturing facilities, OCM provided a timely complement to this firm's hard-pressed staff as well as offering the necessary design aids capability to speed the project along.

The Centre also provided a significant amount of design work at the front end of the project, especially in partitioning and redesigning to accommodate the use of the gate array. Out of some 70 semi-custom IC manufacturers in North America, only four were capable of making the device. Mitel Corp. of Kanata was subcontracted to do the manufacturing.

The tiny imprint on reconnaissance film is made possible by Optotek's light emitting diode (LED) array. A semi-custom chip made with OCM assistance reduced the electronics to fit the next generation of smaller cameras.

Mainly concentrating on export markets, Optotek also makes specialized LED products for office, aerospace and general industrial applications. Optotek, which also emphasizes contract R & D, is also working closely with the Centre on a different style gate array for a LED-based non-impact printer.

New Manufacturing Opportunity Created by Ottawa Firm

Jemtech Ltd. President John G. Harris, left, and OCM Senior Consultant Valek Szwarc review Centre's report on a new block mode communications device.

Sometimes when opportunity knocks, nobody's home. More frequently, though, a chance evaporates because the door opens too slowly. Fortunately for microcomputer users, an Ottawa consulting firm pressed for time used its management know-how to fashion a unique entrance of its own — straight into manufacturing.

The result, unveiled by JEMTECH Ltd. of Ottawa at the Canadian Computer Show and Conference in Toronto, lets mainframe computers share information with microcomputers. However, unlike the flurry of devices that allow mainframes to converse with smaller computers interactively in real time, JEMTECH's stand-alone communications link allows them to exchange information in cost-saving chunks, a technique known in data processing as batch transfers. Slightly bigger than a cigar box, the low-cost MEDIATOR-R allows a microcomputer to extract data from a corporate computer for use with an electronic spreadsheet. In another application the unit might also be used to capture data on the small computers for local processing and subsequent transmission to the mainframe.

The need for this device was identified by The Laurier Group of Ottawa during the normal course of their work as management and computer systems consultants. Observing a growing requirement for batch mode links between mainframes and the mushrooming base of small computers, the Group embarked on a marketing study to validate their suspicions. They found a multi-million dollar market, but there was a catch. Most of it would only be available in the next three years. So they had to move fast.

The Ottawa Group developed the technical specifications for the basic concept and turned to the Ontario Centre for Microelectronics for advice. They weren't looking for complex technology. Basically, they wanted a single board computer, some programming and a power supply, all brought together with an eye to production costs.

OCM working to the specifications, undertook the study which identified various alternatives available. Part of this job was sorting through 100 companies who made a total of 300 single board computers. OCM's recommendations included suitable technical choices for the computer, the enclosure, power supply and advice on the development system used to program the microcomputer in the device. OCM then built two prototypes of the final product in their lab. The result was a solution priced lower than anticipated.

The MEDIATOR-R used the most widely supported method of transferring data on medium and large computers, the IBM 3780 protocol. The unit is compatible with any ASCII computer terminal and can be made compatible with any microcomputer through a short (16 line) program easily written in the BASIC programming language. The device works at 2,400 bits per second and up and provides fast economical error-checked communications.

FINANCIAL STATEMENTS AND AUDITOR'S REPORT

To Ontario Centre for Microelectronics
and Minister of Industry and Trade
of the Province of Ontario:

We have examined the balance sheet of the Ontario Centre for Microelectronics as at March 31, 1984 and the statements of revenue and expenditures and surplus, reserve for capital assets and of changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of the Centre as at March 31, 1984 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Deloitte Haskins + Sells

Auditors
May 10, 1984

Statement of Revenue and Expenditures and Surplus Year Ended March 31, 1984

	1984	1983
PROGRAM EXPENSES — Schedule 1		
Technical	$1,268,505	$ 409,880
Communications	1,095,951	469,599
	2,364,456	879,479
RECOVERY OF PROGRAM EXPENSES	318,524	54,172
NET PROGRAM EXPENSES	2,045,932	825,307
ADMINISTRATION — Schedule 2	696,893	326,026
NON RECURRING EXPENSES	—	324,639
TOTAL NET OPERATING EXPENSES	2,742,825	1,475,972
OPERATIONS CONTRIBUTION FROM PROVINCE OF ONTARIO (Note 2)	2,951,203	1,520,455
EXCESS OF REVENUE OVER EXPENDITURES	208,378	44,483
SURPLUS, BEGINNING OF YEAR	44,483	—
SURPLUS, END OF YEAR	$ 252,861	$ 44,483

Statement of Reserve for Capital Assets
Year Ended March 31, 1984

	1984	1983
CONTRIBUTIONS FROM PROVINCE OF ONTARIO (Note 1)		
Allocated to capital expenditures	$ 775,731	$1,511,499
Less disposals	(41,342)	—
	734,389	1,511,499
TRANSFER TO OPERATIONS (Note 2)	390,592	139,014
	343,797	1,372,485
BALANCE, BEGINNING OF YEAR	1,372,485	—
BALANCE, END OF YEAR	$1,716,282	$1,372,485

Balance Sheet
March 31, 1984

Assets

	1984	1983
CURRENT ASSETS		
Cash	$ 208,027	$ 100
Accounts receivable		
Trade and other	154,693	35,933
Province of Ontario	—	1,233,000
Prepaid expenses	16,715	89,684
	379,435	1,358,717
FIXED ASSETS (Note 3)	1,684,265	1,303,813
LICENSE (Note 4)	32,017	68,672
	$2,095,717	$2,731,202
Liabilities		
CURRENT LIABILITIES		
Accounts payable and accrued charges	$ 126,574	$1,314,234
Equity		
SURPLUS	252,861	44,483
RESERVE FOR CAPITAL ASSETS	1,716,282	1,372,485
	$2,095,717	$2,731,202

Gordon W. Gow
Chairman

Charles Williams
Director

Statement of Changes in Financial Position Year Ended March 31, 1984

	1984	1983
SOURCES OF WORKING CAPITAL		
Operations		
Excess of revenue over expenditures	$ 208,378	$ 44,483
Items not affecting working capital		
Depreciation and amortization	390,592	139,014
Transfer from reserve for capital assets	(390,592)	(139,014)
	208,378	44,483
Proceeds from disposal of assets	41,342	—
Contributions from Province of Ontario for capital assets	734,389	1,511,499
	984,109	1,555,982
USES OF WORKING CAPITAL		
Purchase of fixed assets	775,731	1,438,190
Acquisition of license	—	73,309
	775,731	1,511,499
INCREASE IN WORKING CAPITAL	208,378	44,483
WORKING CAPITAL, BEGINNING OF YEAR	44,483	—
WORKING CAPITAL, END OF YEAR	$ 252,861	$ 44,483

Notes to the Financial Statements March 31, 1984

1. Significant Accounting Policies

The financial statements have been prepared in accordance with generally accepted accounting principles and reflect the following policies:

Fixed Assets

Fixed assets are stated at cost. Equipment and furniture are depreciated by the straight-line method at rates calculated to amortize the cost of the assets, less salvage value, over their estimated useful lives. Leasehold improvements are amortized by the straight-line method over the terms of the respective leases.

Licenses

Licenses are stated at cost and are depreciated by the straight-line method over two years being the estimated life of the license.

Contributions from the Province of Ontario

The contributions are made without reference to source or type of expenditure. The breakdown shown in the financial statements is based on the

capital asset expenditures by the Centre and the balance is designated for operations.

Contributions for capital assets are credited to reserve for capital assets and recognized as income as the depreciation of the related assets are charged against operations.

Contributions for operations are recognized as revenue in the period in which they are committed by the Province.

Revenue Recognition

Contract revenue is recognized on the percentage of completion basis.

2. Contributions from Province of Ontario

	1984	1983
Total contributions	$3,295,000	$2,892,940
Less amount assigned to capital assets (net of disposals 1984 — $41,342; 1983 — Nil)	734,389	1,511,499
	2,560,611	1,381,441
Transfer from reserve for capital assets	390,592	139,014
Operations contributions	$2,951,203	$1,520,455

3. Fixed Assets

	1984			1983	
	Cost	Accumulated Depreciation and Amortization	Net Book Value	Net Book Value	Depreciation Rates
Technical equipment	$1,550,361	$340,332	$1,210,029	$ 888,837	20%
Office equipment	175,058	32,953	142,105	106,632	20%
Office furniture	258,283	65,841	192,442	164,024	20%
Leasehold improvements	188,878	49,189	139,689	144,320	4 Years
	$2,172,580	$488,315	$1,684,265	$1,303,813	

Depreciation and amortization for the year totalled $353,937 (1983 — $134,337)

4. License

	1984	1983
Cost	$73,309	$73,309
Accumulated amortization	41,292	4,637
	$32,017	$68,672

Amortization for the year totalled $36,655 (1983 — $4,637)

Schedule 1
Schedule of Program Costs
Year Ended March 31, 1984

	Technical	Communications	1984 Total	1983 Total
Advertising	$ —	$ 76,484	$ 76,484	$ 25,357
Computer rentals and maintenance	111,452	—	111,452	26,910
Depreciation and amortization	303,979	51,081	355,060	125,541
Material	65,025	164,281	229,306	129,769
Salaries				
Secondment	181,264	117,803	299,067	247,192
Staff and benefits	364,468	279,363	643,831	115,664
Seminar expenses	—	165,480	165,480	6,397
Technical and professional services	69,378	105,869	175,247	72,478
Telephone and rent	148,925	40,389	189,314	110,486
Travel and accommodation	24,014	95,201	119,215	19,685
	$1,268,505	$1,095,951	$2,364,456	$879,479

Schedule 2
Schedule of Administration Costs
Year Ended March 31, 1984

	1984	1983
Depreciation and amortization	$ 35,532	$ 13,473
Directors' meetings	33,652	15,853
Equipment rentals	27,221	25,111
Postage and stationery	52,920	29,764
Recruiting and relocation	41,953	11,652
Salaries		
Secondment	—	52,938
Staff and benefits	362,333	105,997
Supplies and services	63,495	13,351
Telephone and rent	40,389	46,101
Travel and accommodation	39,398	11,786
	$696,893	$326,026

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